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THE MADRAS CLINICAL JOURNAL

JOURNAL OF THE MADRAS STATE BRANCH INDIAN MEDICAL ASSOCIATION
(With which is incorporated the "Miscellany")

Vol. XXV JUNE 1959 No. 12

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DRUG THERAPY IN PAEDIATRICS*

by

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Though Paediatrics is a speciality it is perhaps the only speciality where the general practitioners see the majority of cases. I am sure you will all agree with me that a large of bulk of your patients are children. During the last 10 or 11 years of Paediatric practice I find a vast change in drug therapy in Paediatrics due to great advances in the knowledge of Bacteriology and the advent of Chemotherapeutic agents and antibiotics. The writing of "elegant prescriptions" and "the exhibition of a wide variety of drugs" are no longer necessary. Parents are also being educated to understand that a bottle of medicine is not an essential sequelae to each visit to, or by, the doctor. These days we have powerful drugs, powerful and yet dangerous if improperly used. A large number of patent preparations with eye catching names are on the market. Unless their ingredients and their proper concentrations are clearly understood there is a real danger of serious consequences in young infants and children. With our modern drugs, even some of the apparently moribund infants could often be saved, if drugs are given in proper dosage. I should be pardoned if I harp on the point of proper dosage a little too long as we not uncommonly see severe infections like bacterial meningitis treated either with inadequate therapy or for too short a period which often results in irreversible sequelae like mental deficiency, paralysis blindness etc.,

Fortunately there are only a few drugs which have a wide use is Paediatric practice. These are mainly antibiotics, sulphonamides, analgesics, autonomic drugs, sedatives including those used for anticonvulsant therapy, antiallergic drugs, anti-malarial kala-azar and amoebicidal drugs and few others like digitalis preparations, Iron, thyroid etc.,

The therapeutic dose of most of the drugs are determined by pharmacologic evaluation initially in animals and subsequently in human adults and there are inadequate pharmacologic data for the determination of dosages of most drugs in infants and children. For this reason a number of formulae have been developed to estimate the dose for a child from the experimentally determined adult dose. The common ones, as you

* Lecture delivered at the Trichy Branch of I. M. A. on 20—12—58.

are aware, go by the name of Fried's rule (i.e. for infants—

$$\frac{\text{Adult dose } x \text{ Age in months)}}{150}$$

or Clark's rule for older children i.e.,

$$\frac{\text{Adult dose } x \text{ wt. in lbs.}}{150.}$$

These formulae have the obvious defects that they do not provide for the marked variations in physiologic functions at different ages, as children and adults markedly differ in their reactions to many drugs.

However, no rule for calculating the dosage of drugs for children is completely satisfactory. But by a more or less empirical methods as well as by more scientific studies we have now come to know the correct doses of many commonly used drugs in children of different ages with different diseases. This dosage schedule I have tabulated in the end.

It would be worthwhile at this point to consider certain general principles in the administration of drugs to infants and children.

1. Many of the dosage schedules here should be regarded as guides and the dose altered if necessary in order to achieve the desired effect. As for example one tea spoon ful of milk of magnesia might produce different results in two apparently identical infants or the prescribed dosage of Chlorpromazine (Largactil) might produce excessive drowsiness in one and none at all in the other. But by and large it is advantageous to stick to prescribed doses in antibiotics and chemotherapeutic agents unless there are some very special reasons.

2. The method of administration of a therapeutic agent will depend upon several factors. Some drugs can be given by several routes others by only one. It it important for obvious reasons to prevent pain in children when this does not interfere with effective therapy. For this reason when a choice of several drugs exists but only one can be given orally, this may be the drug of choice, provided the economic considerations do not come into the picture too much. On the other hand when time is an important factor or vomiting is present, injection may be the most desirable method of administration.

3. As far as possible palatability of the drug should be considered. Unpalatable medications should not be given in the foods of the child's basic diet since feeding problems may be precipitated or aggravated.

4. Pills should never be given to children who will not swallow them, because of the dangers of aspiration.

5. Great care should be taken in prescription writing for children and one should be quite familiar with the ingredients used and their potential ill-effects on the child.

Now I would like to high-light some points for your consideration while administering some common drugs. I have grouped these drugs according to their general therapeutic action.

Chemotherapeutic Agents and Antibiotics :

The selection of the chemotherapeutic agents or antibiotics will primarily depend upon the aetiologic cause, the severity of infection, the age of the child and the ease of administration. Therapy with multiple therapeutic agents is sometimes desirable especially in some severe infections and also where one is not sure of the exact organisms causing the disease and their sensitivity to a particular drug. When two antibiotics act simultaneously on a homogenous microbial population the effect may be one of the following :

1. Indifference. i. e., the combined action of 2 antibiotics is not greater than that of the more effective agent when used alone.

2. Addition. i. e., the combined action is equivalent to the sum of the actions of each drug when used alone.

3. Synergism. i. e., the combined action is significantly greater than the sum of both effects.

4. Antagonism. i. e., the combincd action is less than that of the more effective drug when used alone.

There has been considerable in vitro and in vivo experiments in recent years on these effects and it is now fairly well established that indifferenee or simple addition are the most common effects of drug combination. Synergism is relatively rare and antagonism is the most unlikely event in clinical antimicrobial therapy. In practical terms antibacterial agents could be divided into bacteriocidal drugs such as Penicillin, Streptomycin etc., or bacteriostatic drugs like all tetracyclines including chlor & oxytetracyclines, erythromycin and sulphonamide drugs. If an organism is relatively resistant to any of the bacteriocidal agents the addition of a bacteriostatic drug or of another bacteriocidal agent may lead to an added or synergistic effect. On the other hand if the organism is quite sensitive to any of the bacteriocidal agents, the addition of a bacteriostatic drug may occasionally interfere somewhat with the action of the effective bacteriocidal agent. It is well to remember that the drug chosen for the treatment of a bacterial infection requires sometime to act. The switching of antibiotics or the adding of second or third antibiotic agent within 24 hours because a child does not promptly become a febrile, usually leads to more difficulties than are solved. The drug treatment should be continued for adequate time to ensure complete eradication of all infection. Antibiotic therapy should be continued for at least 4 days in the face of prompt clinical response if there was indication for its use in the first place. On the other hand in some chronic infections of bone, kidney etc., it may be necessary to continue the therapy for many months.

Soluble Sulpha group. (*i. e., sulphadiazine, sulphamezathine, elkosin, Gantisin, Irgafen, triple sulpha preparations etc.,*) contrary to the bacteriological studies in the west which has established a viral aetiology to most of the common upper respiratory infections our recent investigations tend to show that most of the common respiratory infections which form the bulk of our day-today outpatient attendance are caused by bacterial agents which are amenable to, sulpha. I believe that one should not hesitate to use these preparations in any child coming with short fever, cough and a congested throat. Average dose will be 1 gr. per lb. per day. Of course in severe infections especially in infants one can use upto 2 gr. per lb. per day. It is desirable to give a larger initial dose than the subsequent ones. A common cause for failure is to stop therapy soon. As I have already stated if the drug is indicated it should be continued for at least 4 or 5 days regardless of apparent recovery before this time. This drug is also used as a prophylactic agent in very small doses for rheumatic fever patients in the inactive stages to prevent further relapses and naturally it means that the drug has to be continued in that small dosage for several months or even years.

Poorly absorbed sulpha preparations like Sulphaguanadine, Succinyl-sulphathiazole, Pthalyl Sulpha thiazol are drugs of choice in acute bacillary dysentery and other nonspecific diarrhoeas which are very common in infants and children, The common cause of failure of treatment specially in bacillary dysentery is inadequate therapy. It should be emphasised that a dosage of 2 gr. per lb. per day of sulphaguanadine should be given for 4 to 6 days in all cases of bacillary dysentery especially in

infants. If this is not done it may at times lead to a chronic post-dysenteric colitis which is quite intractable for routine treatment.

Penicillin

I need not tell here any reasons for the fact that Penicillin alone or in combination with Sulpha preparations remains the most useful and rightly the most widely used chemotherapeutic agent in Paediatric practice. Much advance has occurred in oral penicillin therapy and now we have an acid salt which produces fairly constant blood levels and fewer gastrointestinal disturbances. However till to-day it cannot completely replace the needle.

Tetracycline Group of Drugs & Chloramphenicol.

These constitute a very valuable group of wide-spectrum antibiotics. They are as you are aware highly effective against a wide variety of gram positive and gram negative bacteriae, Spirochaetes, and ricketsial infections like typhus fever. However, it is worthwhile to remember that in infections equally sensitive to Penicillin and these group of drugs, the former i.e. Penicillin is still to be preferred because of its fewer adverse effects. In the treatment of enteric fever it is important that the dosage of chloramphenicol should be 25 mgms. lb./day in divided doses in children and even upto 50 mgms./lb./day in smaller infants and this dose maintained for a minimum of 48 hours after the temperature touches normal and then gradually tailed off in another six days. Failure to do this often leads to relapses. In the treatment of bacterial meningitis other than tuberculosis meningitis where the nature of the offending organism is not known the drugs of choice will be Chloramphenicol and sulpha preferably intramuscular during the first 24–48 hours. I would like to emphasise that dose of intramuscular chloramphenicol is even higher than the oral dose i. e., 100 mgms./kgm./day in 2 divided doses.

If the organism causing meningitis is identified as Pneumococcus then the choice of antibiotic would be Penicillin in very high doses i.e., 10 lacs of crystalline Penicillin I. M., every 2 hours round the clock for 48 to 72 hours and later 10 lacs 4th or 6th hourly depending on the condition of the infant.

In Meningococcal meningitis Sulpha 2 grains/lb./day and even 3 gr./lb./day in small infants is the drug of choice. In all other bacterial infections of the meninges Chloramphenicol and Sulpha are to be preferred including in the commonest bacterial meningitis seen in our department i.e., influenzal meningitis —caused by H. Influenzae and not virus.

Other Antibiotics

Erythromycin (Ilotycin). This has a range of activity similar to Penicillin and in adequate dosage i.e., 15-30 mgms./lb./day in 4 divided doses is very effective in all conditions where the organisms have developed Penicillin resistance especially in staphylococcal infections. This drug also is very useful in cases of diphtheria when given along with antidiphtheric serum.

Bacitracin & Neomycin:

These are powerful bacteriocidal drugs with a very broad antibacterial spectrum but damage renal tubules when given parenterally. According to recent reports it is found that the toxicity seems much less common in children than in adults and their use in dosage outlined could be at times life-saving in the managment of serious bacterial disease. However their parenteral use should be limited to hospitalised children and to infections not responding to other antibacterial therapy. These drugs are not effective in systemic infections when given orally as the absorption is poor. Of late Neomycin by oral route is gaining some

prominence in cases of certain neonatal gastrointestinal infections. In Bacillus Pyocyaneous infections Polymyxin is the drug of choice.

Streptomycin, I. N. H. & P. A. S.,

In this short article one cannot do justification for discussion of indications, contra-indications and limitations of drug therapy in tuberculosis. However I would like to state that all Mantoux positive infants less than one year with or without symptoms should be treated with I. N. H., at least, except in rare instances. The importance of early recognition and adequate therapy of tuberculous meningitis cannot be over emphasised. The treatment with streptomycin even in apparently cured cases of T. B. Meningitis should be continued for at least 6 months and I. N. H. with or without P. A. S. for a period of 2 years.

Analgesic Drugs:

Aspirin.—It is one of the most useful drugs in Paediatric practice. I am afraid, many hesitate to give aspirin or its compounds to children for fear of its toxic effects which seldom occur if given in proper dosage i. e., 1 gr./year of age/ per dose upto a maximum of 5 grains for many types of minor pains and discomforts and also in most of the febrile illnesses, to give symptomatic relief to a child even when specific antibacterial drug is being given. Its effectiveness can be advantageously enhanced if a sedative like Phenobarbitone is combined with it. This is of special value in preventing febrile convulsions. As you know aspirin has also a specific effect upon rheumatic fever and its dosage here is different.

Morphine.—Is a very powerful analgesic. In doses of 1/600 gr./lb. body wt. it is of excellent value in children in the treatment of cardiac failure when the accompanying distress is marked and it helps to relieve the anxiety which frequently is present. As a general rule it should not be used in the presence of marked abdominal distension or toxaemia. Overdosage of course will depress the vital centres of respiration and also cough reflex.

Autonomic Drugs: i. e. Adrenaline, Atropine and Ephedrine. The reaction of infants and children to these agents and particularly to atropine is more variable than in adults. For this reason considerable caution should be exercised in administering them.

Atropine.—Tr. Belladona is still very commonly used indiscriminately for vomiting in small infants and also incorporated in cough mixtures. Due to drying up of secretions it may cause thick mucous plugs in the respiratory tract and may cause obstruction in small infants. Its main use in Paediatrics at present is to keep the respiratory tract clear of secretions during operative procedures under general anaesthesia. Even here it may sometimes cause hyper-pyrexia by inhibiting sweating and normal loss of body heat during operations and this may be aggravated by the hot lights and covers.

Adrenaline:—Used as a stimulant as in peripheral failure after scorpion sting in infants and children, in asthma it is effective if given early on and repeated as often as necessary and also useful in severe serum reactions.

Ephedrine:—This has a similar action to adrenaline but mild and more prolonged. Effective orally also.

Sedatives :—

Phenobarbitone, Chloral Hydras & Paraldehyde are the most widely used sedatives in Paediatric practice and they are the best in proper dosages as they have a wide margin of safety.

Phenobarbitone :— Infants are more tolerant than older children and adults and hence require comparatively larger quantities. Useful in febrile and idiopathic convulsions.

Paraldehyde :— Has the same indications as phenobarbitone and even some what better in smaller infants. Practically no contraindications except in very severe broncho-pulmonary disease and also it may cause considerable initial pain when given by intramuscular route. Excellent to control convulsive attacks and in tetanus.

Chloral Hydras :— This drug is unparalleled in its usefulness and harmlessness as a sedative especially in young infants. The only disadvantage being that it rapidly deteriorates in mixtures containing syrup. It should be given in Aqua anithi or chloroform in doses of 1–2 gr./year of age repeated as often as necessary.

Anticonvulsant Therapy :

Emergency therapy : Most of the febrile convulsions stop by themselves within 2 or 3 minutes. If it recurs or persists paraldehyde or phenobarbitone in specified dosages repeated if necessary will terminate the attack. However, ethyl chloride spray administered only to the point of stopping the convulsions is the quickest way of stopping a convulsion and it has the additional advantage that it can always be carried in a physician's bag. Convulsions due to cerebral oedema in acute nephritis are controlled by I.M. Mag. Sulph.

For Epilepsy :

Grand Mal :—Barbiturates and hydantoin group of drugs still hold the field. Majority of cases could be brought under control by judicious use of either or both of the drugs.

Petit Mal :—Group of seizures are not that easy to control. Any of the "dione" group of drugs, Diamox, Mepabromate and amphetamine may be tried.

Anti-Allergic Drugs :

Antihistaminics are now available in many forms with as many different formulae as there are companies producing them. It should be emphasised that when one is not effective it does not mean that others will be of no value. Several may be tried before the best one or the best ones for the individual child is found. These drugs are most useful in the treatment of allergies of the respiratory tract but much less effective in eczema, contact dermatitis and food allergies. Because they are not very toxic they can be used fairly freely but certainly not indiscriminately. Excessive drowsiness and anorexia are the side-effects of many.

ACTH & Cortisone :

These drugs are indicated in certain paediatric emergencies like severe asthma, and asthmatic bronchitis and in fulminating septicaemias where already adequate antibiotic therapy is being given as in severe enteric fevers. It is useful and sometimes life saving in shock after scorpion sting. Of course it is obviously impossible to discuss all of the paediatric disorders treated with adrenal hormones. Their use is fairly well outlined in cases of rheumatic fever, rheumatoid arthritis, nephroses, and as an adjunct to antituberculous therapy. Its use includes cases of idiopathic thrombocytopenic purpura, leukemia, chronic liver disease etc., Indiscriminate prescription of adreno-cortical hormones in Paediatric disease where a diagnosis has not been established is to be decried. The practicing physician should clearly understand the actions and possible complications of treatment and should observe the precautionary methods for dealing with the complications.

Antihelminthics.—Thanks to the discovery of piperazine derivatives the drug treatment of the commonest roundworm and threadworm infestations is simplified. The proper dosages and duration of therapy for various worm infestations are mentioned in the dosage schedule.

Dosages for antimalarial, antikala-azar and amoebicidal drugs in infants and children are also given in detail in the schedule. However I would like to sound a note of warning regarding the danger of giving emetine to small infants and children especially to the malnourished ones which is very real. I have seen quite a few cases of heart failure as a result of indiscriminate therapy with emetine in small children.

Miscellaneous Drugs :

Aminophylline :—This in the scheduled dose is an excellent drug for the treatment of severe asthmatic child. As you are aware it could be given is oral, intra-muscular, intra-venous and rectal routes. I would like to stress that for a rectal drip aminophylline in water should be prepared fresh before administration.

Digitalis :—Tr. digitalis is hardly ever used now-a-days in infants and children ; and purer preparations like Digitoxin. Digoxin and Cedilanid are preferred. The digitalis preparation to be used depends on whether one wants a very rapid digitalisation, slow or moderately quick digitalisation. It is better here to be familiar with one preparation in each group. Digitoxin is a relatively slow acting glycoside with maximal effects 4 hours after I. V. administration ; and 6–8 hours after oral therapy. Elimination of the drug is also slow (2 or 3 weeks).

Lanatocide C (Cedilanid) is a rapidly acting drug usually given I. V. and sometimes I. M., Appreciable effect of drug is seen in 10 to 15 minutes after I. V. administration and maximal effects are achieved within one hour. It is virtually completely eliminated in 24 to 30 hours. This is the drug of choice when extreme cases of congestive failure (especially with acute Glomerulonephritis) come to the doctor in almost in moribund state and when they are not likely to survive for few hours to allow the slower acting drugs to act.

Digoxin is a good all round preparation and in terms of rapidity of absorption and elimination it is midway between digitoxin and lanatocide C. Full effects of digitalisation are noticed in 4 hours when given intra-venously. It is excreted within 72 hours.

Whatever drug is used it should be realised that digitalisation of every child is an individual experiment and the child should be watched for effects of digitalising during the first 18–24 hours after starting with the lower prescribed dose and later therapy modified according to effects. In general smaller infants need comparatively more drug for digitalisation.

Drug Therapy is a vast subject in Paediatrics and it is neither my intention ner my desire to cover the whole subject. It is not in the realm of practicability to cover all the vast array of drugs and their use in such a short article. If this short article has created some interest and if the list of dosages could be of some practical use, I should be more than satisfied.

Dosage of Common Drugs in Paediatrics:—

To many the apparently arbitrary use of the metric or apothecary's system of measurements for different drugs given below could be confusing. We have to put up with it because the units selected often have a more easily remembered relationship in one system than in another. Only dosages of fairly common drugs are given in this schedule. The following rule of thumb may be helpful (with all its limitations) for any drug for which no "pre cooked" dosage is given !

Birth to 3 months	1/30th of adult dose or 1/3 dose of 1 year.
6 months	1/20th of adult dose or ½ dose of 1 year.
1 year	1/10th of adult dose.
2 years	1/7th of adult dose.
3 years	1/5th of adult dose.
4 years	1/4th of adult dose.
6 years	1/3rd of adult dose.
8 to 12 years	2/5 to 1/2 of adult dose.

Rough method of calculating weight from age.—

A baby doubles its birth weight by about 5 months, trebles it by one year and quadruples it at 2 years.

From 2 to 12 years weight is = (age plus 3) × 5.
e.g. a Four year old child will weigh 4 plus 3 × 5 i.e. 35 lbs.

1 gr. is equal to 60 mgms.
1 kg. is equal to 2·2· lbs.

* * * * *

SOLUBLE SULPHA (Sulphadiazine, Sulpha mezathine, Elkosin, Gantrisin Triple Sulphas etc.)		1 gr./lb. per day divided doses.
SULPHAGUANADINE		2 grains per lb. per day.
CRYSTALLINE PENICILLIN	I. M. ORAL	10,000 units per pound per day. 100,000 to 300,000 units 6 times a day ½ hour before food.
PENICILLIN V	ORAL	100,000 to 300,000 units 4 times a day.
BENZATHINE PENICILLIN	ORAL I. M.	300,000 units 4 times daily. 600,000 or 1,200,000 units single injection.
STREPTOMYCIN OR DIHYDRO-STREPTOMYCIN	I. M.	10–20 mgms./lb./day in 2 doses. In tuberculous meningitis in small infants upto 40 mgms./lb./day.
I. N. H.	ORAL	5 mgms. / lb. / day. In cases of T. B. meningitis at times even three times this dose is given.
P. A. S.	ORAL	100 mgms. / lb. / day in 4 doses.
CHLORAMPHENICOL	ORAL I. M.	25 to 50 mgms. / lb / day in 4 doses (smaller the infant larger the dose per pound : doses upto 90 mgms. / lb. may be given in severe infections : 50 mgms. / lb. (In two doses).
TETRACYCLINE (Achromycin Tetracin etc.)	ORAL I. M. I. V.	10–20 mgms. / lb. / day in 4 doses. 6 mgms. / lb. / day in 2 doses. 6 mgms. / lb. / day in 2 doses. Minimum dilution 1 mgm. / c. c. in Glucose or saline.
OXYTETRACYCLINE (Terramycin)	ORAL I. M. & I. V.	10–20 mgm. / lb. / day in 4 doses. Same as tetracycline.
CHLORTETRACYCLINE (Aureomycin)	ORAL I. V.	10 mgms. / lb. / day in 4 doses. Same as tetracycline.

ERYTHROMYCIN (Ilotycin etc.)	ORAL	15–30 mgms. / lb. day in 4 doses.
NEOMYCIN	ORAL I. M.	15 mgms. / lb. / day in 4 doses. 4 mgms. / lb. / day in 4 doses.
POLYMYXINE B	ORAL I. M.	5–10 mgms. / lb. / day in 4 doses. 1 mgm. / lb. / day in 3 doses.
BACITRACIN	ORAL I. M.	1,000 units / lb. / day in 4 doses. 300–600 units / lb. / day in 3 doses Not to exceed 50,000 units / day. Both Neomycin and Bacitracin I. M. should be used with caution. By oral route because of the poor absorption good action.
NYSTATIN (MYCOSTATIN)	ORAL	400,000 to 800,000 units for infants.

Analgesic Drugs :

ACETYL SALICYLIC ACID (Aspirin)	ORAL	Grain 1 per year of age / dose for anti-pyretic & analgesic effect. (Do not exceed maximum of 5 gr. per dose). In rheumatic fever ½ to 1 gr. per lb. wt. per day with double the amount of Soda bicarb. Caution : This dose borders on toxic levels.
MORPHINE	S. C.	1/600 gr. / lb. / day.

Autonomic Drugs :

ADRENALINE (aqueous)	S. C. or I. M.	0·025 c.c. / kgm. Max. Dose 0 5 c c.
EPHEDRINE SULPHATE	ORAL	1/60 gr./kgm. (single dose), (⅛ gr. for infants / per dose ¼ gr. for older children will usually be alright).

Sedatives :

PHENOBARBITONE	ORAL I. M.	1·5 mgm./lb./day 1·5 to 2.5 mgm./lb./day (As phenobarbitone acts on the cerebral cortex which is not well developed in infants larger doses are necessary e. g. to stop a convulsion it may be necessary to give ½ to 1 gr. I.M.)
PARALDEHYDE	I. M. ORAL RECTAL	½ c.c. for each 10 lbs. body weight. ½ to ¾ c.c. for each 10 lbs. body wt. 1½ to 3 c.c. for each 10 lbs. body wt.
CHLORAL HYDRAS	ORAL	1–2 gr. / year of age / dose. Repeat as often as necessary.

BROMIDES	ORAL	1 gr. / year of age / dose.
Anticonvulsant Drugs:		
PHENOBARBITONE	ORAL	1/8 gr. to 1/2 gr. 1–3 times daily for infants. 1/2 to 1 1/2 gr. 1–4 times daily for older children.
DILANTIN	ORAL	1/4 gr. 2 or 3 times daily in infants. 1 1/2 gr. 1 to 4 times daily in older children.
MEBARAL	ORAL	Double that of phenobarbitone.
MESANTOIN	ORAL	Same as that of Dilantin.
TRIDIONE	ORAL	9 to 30 mgms. / lb. / day.
PARADIONE	ORAL	Same dose as Tridione.
DIAMOX	ORAL	5 mgms. / kgm. / day.
AMPHETAMINE	ORAL	0·4 mgms . kgm. / day. Do not exceed 5 mgms. per day.

Anti-Allergic Drugs: Most of the Antihistaminic drugs 2–4 mgms/lb./day. Except Histadyl which is 0·4 mgms./lb./ dose 2–4 times per day and Thephorin 5–25 mgms. t.d.s. / day.

Antihelminthics:

Ascariasis

SANTONIN— 1/4 gr. per year of age. Maximum 2 grains.

PIPERAZINE DERIVATIVES—300 mgms. per year of age per day for 5 days. The total dose may also be given in one day.

Threadworms

GENTIAN VIOLET— 1/6 gr. per year of age per day divided into 3 to 4 doses along with meals.

PIPERAZINE DERIVATIVES—Same does as for ascariasis but to be given for 7 to 10 days.

Hookworm

TETRACHLOR-ETHYLENE— 0·2 c.c. for each year of apparent age.

When hookworm infestation is complicated with ascariasis Hexyl-resorcinol (Crystoids) should first be administered in doses of 0·1 G./year of apparent age. Maximum Gm. 1. This will remove about 90% of round worms and 75% of hookworms.

Tape-worm

MEPACRINE— With equal amount of Sodabicarb. 4 to 8 years of age 4 tablets. (One tablet every five minutes).

Giardiasis

MEPACRINE—	0—4 years	½ tablet twice daily for 5 days.
	4—8 years	½ tablet thrice daily for 5 days.
	Over 8 years	1 tablet thrice daily for 5 days.

Anti-Malarial Drugs:

Treatment of acute attack : Quinine Sulphate-Oral-1 gr. /5 lbs. body weight/ day for one week.
I. M. Half of the oral dose.
I. V. One fourth of the oral dose.

Mepacrine :	Aralen	(Calculate from the table in the introduction)		Adult dose 2 tabs. St. 2 tabs. 2 hrs. later & t. d. s. 2 for 6 days.
Chloroquinine :	Resochin	,,	,,	6 tabs. I day then 2 tabs. for 2 days.
Amodiaquin : (Camoquin)	Nevaquin	,,	,,	3 tabs. single dose.

Protective Drugs:

PALUDRINE & DARAPRIM— ½ to 1 tablet per week.

Kala-Azar:

STIBATIN—	0–3 years	Total 20 c.c. I.M.	in 10–20 days.
	3–5 years	Total 30 c.c. I.M.	in 10–20 days.
	5–8 years	Total 40 c.c. I.M.	in 10–20 days.
	Over 8 years	Same as adult dose.	
UREASTIBAMINE—	0–3 years	Total 0.8 G.	I. V.
	3–5 years	Total 1.25 G.	I. V.
	5–8 years	Total 1.60 G.	I. V.
		Initial dose should be 0.025 G. and gradually to be worked up to total dose in about 14 injections.	

Amoebicidal Drugs:

EMETINE HYDROCHLORIDE— 0.45 mgm. / lb. body wt. per day more *Not more than 3 injections. Caution*—Very severe intolerance especially in ill-nourished children. Restrict use to a few well selected acute cases.

DIODOQUIN— ½ to 1 tablet 2—3 times a day for 10 to 20 days.

MILIBIS— ½ tablet (250 mgms.) t. d. s. with meals for 8 days. Infants less than 6 months—½ this dose.

THIOCARBARSONE— 2—3 mgms./lb. body weight/day divided into 3 or 4 portions for 10 days. (25—50 mgm. enetric coated pill.)

AUREOMYCIN & TERRAMYCIN 5—10 mgms./lb. body weight t. d. s., Given for speedier control of symptoms,

MISCELLANEOUS

AMINOPHYLLINE	ORAL I.M. & I.V. RECTAL	2—5 mgms./kg./day. 3 mgms./kg. 6 mgms./kg./day.
CODEINE PHOSPHATE	ORAL	0·8 — 1·5 mgms./kg. body weight in single dose.
A.C.T.H.	I.M.	0·4 units/kgm. every 6 hours.
HYDROCORTISONE & CORTISONE	ORAL I.M.	4—8 mgms./kgm./day. 2—4 mgms./kgm./day.
PREDNISONE & PREDNISOLONE		1/3 to 1/4 dose of Hydrocortisone.
MAG. SULPH (50%)	I.M.	0·1 c.c./kgm. q. 4 to 6 hours. (In acute nephritis with hypertension).

Digitalis Preparations :

TR. DIGITALIS		$22\frac{1}{2}$ m. / 10 lbs. body wt. is the total digitalising dose. 1/10th is maintenance dose.
DIGITOXIN	ORAL I. M. I. V.	Total digitalising dose 0.01 to 0.02 mgm./lb. Maintenance dose 1/10th initial dose daily.
LANATOCIDE C.	I. M. I. V.	Same as Digitoxin. But maintenance dose $\frac{1}{3}$rd the initial dose.
DIGOXIN	ORAL I. M. / I. V	0·02 to 0.03 mgs. / lb. 0.01 to 0.03 mgms. / lb.
THORAZINE (LARGACTIL)	ORAL I. M. RECTAL	0.5 mgm. / kgm. q. 6 hours. 0.5 mgm. / kgm. q, 8 hours p.r.n. (upto 5 years) 5–12 years not over 50 mgms. / day. 2 mgm. / kgm. Caution — Individual infant's reaction unpredictable.

*MANAGEMENT OF HEART FAILURE

By

M. V. KRISHNAMURTHI, B.A., M.B., M.R.C.P., D.T.M.H.,
District Medical Officer, Coimbatore.

HEART failure varies from the most morbid states to the mild breathlessness on moderate exertion, or ankle oedema in the evenings. The importance of proper diagnosis, and proper assessment is most felt in this condition, as therapy has to be adjusted accordingly. Physical signs alone should not lend itself to therapy. A systolic murmur, or an enlarged heart require careful examination but by itself does not warrant treatment.

A prompt look out for the causative condition or any concomitant disease may be rewarded with gratifying results (e.g.) Auricular fibrillation and hyperthyroidism, Anaemia and heart diseases etc.

It is best to advise a cardiac patient to live within his heart, and more hours in bed is a good investment for a cardiac case. Gentle exercise, improves the crippled heart and optimism and discard of self pity are the best approches.

The heart fails when it is unable to meet the demand of the tissues for oxygen and may take three forms. It may fail in its duty towards severe, moderate exertions or even when the individual is at rest. The defect could be in the mechanism of the pump or in the pump itself.

Congestive failure may present itself as massive oedema, Cyanosis, breathlessness, Insomnia and effusions in the body cavities, or just prominence of neck veins, oedema in the ankles by evenings, Oliguria, and a few basal moist sounds in the lungs. The Cardiac output falls, but again this is relative. In Anaemia and hyperthyroidism there is an initial high output and when the heart fails the cardiac output falls but is still more than in a normal heart. We see the opposite in Myxoedema when the cardiac output is low and yet there is no failure. THUS THE NEEDS OF THE TISSUES FOR OXYGEN IS THE PRIME FACTOR.

Among the theories of congestive failure the backward and the forward types still hold the field but are generally inter-dependent. In the former there is increased venous pressure, stasis of blood in the veins, in the direction of the heart. Oedema of the organs and transudates are the rule. In the latter there is initially diminished cardiac output resulting in Ischaemia of the kidneys and the muscles. Kidney retains sodium and water and general fatigue results. The blood volume is increased and is dammed behind the heart.

The symptoms depends on the chambers of the heart affected. In left auricular or ventricular failure there is urgent dyspnoea from congested lungs due to pulmonary oedema, the right side of the heart being normal. Such is the case in Hypertension, Aortic disease, Myocardial infarction and the early stages of failure of pure mitral stenosis. In Right ventricular failure the congestion is borne in the systemic circulation whose capacity is large and hence there is no urgent dyspnoea. This explains why soon after left Ventricular failure when the whole heart follows suit later, there is a sense of relief for the patient from acute

* Lecture delivered at Trichy Branch on 27—12—1958.

symptoms whereas in reality his condition is worse. Right ventricular failure shows venous engorgement, engorged liver and kidneys, and oedema. Simultaneous right and left heart fails in hyperthyroidism, combined mitral and aortic disease, and anaemia, and Emphysema complicated by hypertension.

In failures of the low output types there is intrinsic damage to the myocardium (e.g.) Valvular lesions, Myocardial weakness hypertension and myocardial infarction. Here the extremities are cold and blue, the pulse is small, the central veins are engorged and the diastolic pressure rises.

In high output failure the primary fault is in the periphery (e.g.) hyperthyroidism, pagets disease, Beri Beri (wet) and certain types of corpulmonale. There is an initial high cardiac output and the fall after failure is not much but is not enough to meet the demands of the tissues. There is vasodilation with warm hands, bounding pulse and lowered diastolic pressure.

Congestive failure may be with normal rhythm or accompanied by auricular fibrillation or Tachycardia.

Management

The guiding principles are Rest, sleep, low sodium intake, Digitalis and diuretics.

Rest in bed means rest for many weeks and not any half hearted measure. It must be absolute rest in bed at first. Slight variations can be allowed under certain situations as use of a commode by the bed, rather than the strict use of a bed pan. An adjustable bed could be used with advantage.

Sleep The correction of *Insomnia* is of prime importance. Morphine is the drug for acute cases given subcutaneous or by the intravenous route in urgent cases. A minimum of 7 – 9 hours of sleep is to be ensured. In some Morphine may produce vomiting and pethidine is to be substituted.

Diet The idea is to give rest to the patient and thus to his heart and restriction of metabolism is important. This means less calories or food. The portal congestion present abhors large meals luckily. Proteins should be about 40 – 50 G which will compensate the nitrogen loss. Fats are poorly tolerated but CARBO-HYDRATES are liked.

Restriction of fluids is unnecessary and could be taken enough to quench the excessive thirst prevailing in failure. When salt intake is restricted the urinary output increases, and one to one and a half pints of fluids could be easily given.

Sodium as salt should be reduced to the bare minimum. Even the so called salt free diet means an intake of about 0·5 G / day and low salt diet gives about 2·5 to 3 G /day of salt. The low salt diet is enough as complete restriction of salt may lead to salt depletion syndrome leading to hypochloraemia and on to prereneal Uraemia thus complicating the issues. The salt substitutes are not generally liked by patients and the salt extracting exchange resins are not palatable and may remove the all important potassium also.

For the first few days 800 ccs. of milk yielding 500 C and containing 1 G of Na is good. Milk may not be liked by all and so after 48–72 hours a more generous semisolid diet is advocated (e.g.) Toast, rice congee without salt, but with milk and sugar, glucose water. Among the permitted foods at this stage are, one egg, one pint of milk, all vegetables, cooked without salt, fresh fruits, bread, chappaties, puddings, coffee or tea, and seasonings like curry, pepper, mustard etc. but the total quantity should work out to about 1000 C.

The above diets are of low residue type and a mild laxative will be necessary like pursennid pills, but purgatives are to be avoided as they are fatiguing.

In many cases, Rest, sleep and diet itself improve the patient to obviate cardiac and diuretic drugs.

Digitalis

Among this group of alkaloids the most commonly used are Digoxin, Digitoxin and gitalin. The tinctures and the leaf are good but are being used less now. Digitalis acts directly on the cardiac muscle, producing powerful contraction, thus increasing cardiac output. Slowing of heart is secondary but this also increases the filling. Slowing effect is best used in auricular fibrillation with a fast heart rate. The better cardiac output flushes the kidneys and increases diuresis. Reduction of portal congestion improves the functions of the liver, removing more A. D. H. thus releasing water for diuresis.

Digitalis is of great use in low output failures. In acute Rheumatic carditis and other toxic carditis digitalis is ineffective and may be injurious. Great benefit is seen in left Ventricular failure both acute and chronic. Cardiac asthma can be *prevented* by the judicious use of digitalis and mersalyl.

In Cardiac tamponade from pericardial effusion digitalis is not indicated and may be harmful by reducing the venous pressure which is being maintained and is required for the better filling of the embarassed heart.

Digitalisation can be attained by rapid or slow methods. It depends on the urgency of the situation. In left ventricular failure when rapid digitalisation is urgent 0·25 mg of digoxin and 1/6 Gr. of Morphine are given by the I. V. route followed six hours later by 0·25 mg. of digoxin orally and thereafter. The normal dosage of digoxin is 0·25 mg. six hourly or t.d. s. and the maintenance dosage is arrived at the same rate-Lower dosages than this is mere waste.

The effect of digitalisation is seen in the signs of failure subsiding (i.e.) venous pressure falls, dypnoea lessens, sleep is better, diuresis begins, body weight falls.

Recording of body weight is an index of the progress of the patient.

The specific gravity of urine of bed-ridden patients who cannot be weighed is another method of assessing therapy of digitalis. The specific gravity is high in failure and falls with the onset of diuresis. Size of liver is also another method of assessment in right sided failure as well as regression of pulmonary oedema in left sided failure.

The dosage of digitalis to produce therapeutic effect is near the toxic dose and there is the danger of cumulative effect also. The first symptom of toxicity is head ache and loss of appetite and eight hours later nausea and vomitting appear This is followed by yellow and green vision, gastro-intestinal symptoms and about this time extra systoles appear with coupled beats. Paroxysmal ventricular tachycardia and fibrillation are danger signs.

Lessening of the dose of digitalis on the appearance of early symptoms or its discontinuance for a day is enough, but if the later symptoms are established the treatment has to be stopped and elimination is to be started with oral castor oil and potassium chloride.

In digitalis administration the heart rate is to be taken rather than the pulse which is often deceptive, many of the extrasystoles failing to reach the wrist.

Maintenance of digitalis therapy is important and has to be continued for a

long time and in some cases for life. Early discontinuance is responsible for relapses which are more dangerous than the original attack. Elderly people with chronic myocardial failure, and those having auricular fibrillation which has to continue as such for valid reasons, have to be maintained on digitalis for life.

On discharge from hospital after full digitalisation, further intake should be regular but with an interval of 3 days in the week when he is off the drug to avoid cumulative action.

Digitalis is withheld for heart failure only when recent digitalisation history is not known, or in some cases of high output failure, or in Toxic myocarditis or after Myocardial Infarction.

Diuretics are introduced when the response to digitalis is incomplete; but taking their efficiency into account they are indicated more of ten simultaneously with digitalis. They enhance the action of digitalis. The Mercurial diuretics are the ones most useful. Right sided heart failure responds very well to them, with alleviation of portal and peripheral congestion. Liver shrinks and body weight falls. In left ventricular failure mercurials dramatically relieve the pulmonary edema and thus the dyspnoea.

Mercury acts on the tubular absorption from the kidneys and thus is contra indicated in the presence of kidney damage. Albuminuria is always present in heart failure and is not a sign of renal damage. Renal Damage is shown by the presence of granular and other casts in the urine, when mercurials are to be with-held. The Blood urea is to be watched also and if it is more than 60 mgs. % the mercurials diuretics are better avoided.

These diuretics are given best by the I. V. route but can be given by the I. M. way too. They may be given orally also but are less effective. The ordinary dosage is 2 cc. and could be given twice a week or even every alternate day. Their action can be potentiated by the use of Ammonium chloride one gramme two hours before the administration of the diuretic.

There are some toxic symptoms seen occasionally but still the mercurials have not yet been replaced by any other drug.

A fluid intake, output chart is to be maintained in all cases of heart failure and more so when they are put on diuretics. Minimum salt intake is advocated rather than complete restriction which again is dangerous.

Other diuretics the carbonic anhydrase inhibitors like Diamox etc. are in use now but are not so efficient as the mercurials. But this has a place in the therapy of heart failure when as in many cases only mild diuresis is necessary or should be produced. The diuretic action which is good initially decreases as the bicarbonate level of the bloods falls by diuresis. The new drug chlorthiazide has very good diuretic action with very little side effects and thus has a definite place in the therapy.

Xanthine group has mild diuretic action and can be used in combination with mercurials and other diuretics and do potentiate their action.

When cardiovascular disturbances are attributable to Vitamin deficiencies, their exhibition helps in the recovery. Thiamine has some diuretic property and 25 mg. given parenterally has some effect. In Beri Beri of the wet type, where blood pyruvate level has reached alarming proportions, Thiamine has the major role. Vitamin '.C' 300 mg. is beneficial either orally or parenterally.

The time honoured method of Venesection has still a place in the treatment

of congestive heart failure especially when both the arterial and venous pressures are raised, when the liver is engorged and pulsatile, and when there is much Cyanosis and Oedema.

Symptomatic

Cough and pain are all relieved by the aforesaid methods but a good Linctus can alleviate an irritant cough and for pain there is nothing to replace Morphine.

Oxygen does not relieve cyanosis due to Stasis as in right ventricular failure, but in pulmonary oedema and congestion as happens in left ventricular failure it has a great role. To be effective it has to be given by the oxygen tent, or the B. L. B. mask or atleast by the double nasal catheter. The popular method of one nasal catheter improperly tucked in is not effective but is a waste.

Special features

Now taking some special features of heart failure we often meet with refractory types not responding adequately to the usual procedures.

The patient remains bedridden and water logged. Having ascertained about adequate digitalisation one should exclude *salt depletion syndrome*. If it is present salt intake changes the picture completely and starts diueresis. Mercurials are not indicated here. This syndrome shows itself by lethargy, drowsiness, weakness, oliguria, and *Abdominal pain and cramps*.

In other types of *refractory failure* occasionally spectacular results can be obtained by combining aminophylline and mercurials in a 3 day schedule. Mersalyl 2 cc and aminophylline ·5 G are given. I. V. in the morning followed by Aminophylline ·5 G. I. M. or I. V. in the evening. On the 2nd and 3rd day Aminophylline ·5 G is given I. M. or I. V. morning and evening. This whole course is repeated at intervals of one week or less to get the desired results.

In certain special conditions (e.g.) *Myocardial Infarction* accompanied by heart failure, digitalis, should be withheld for atleast the first 48–72 hours, since there is danger of rupture of the heart and Aminophylline, Oxygen and bed rest are used along with Anticoagulants.

In *Myxoedema* accompanied by hypertension and heart failure, we find that the heart failure does not improve well with the hypothyroid state and treatment of the latter raises the metabolism and worsens the former condition. We have to try to overcome the failure by conventional means and when he is slightly better introduce treatment for Myxoedema simultaneously. Similar problem is seen in Thyrotoxicosis followed by failure where the pathology is opposite.

Anaemia with congestive failure often presents difficulties. The oxygen carrying capacity of the blood is low. Blood transfusion is a hazard because it suddenly overloads the circulation which is already one of the high output type. Transfusion is to be attempted with packed cells and gives happy results.

Acute left ventricular failure is an emergency of the gravest nature and has to be combatted by I. V. digoxin morphine and Aminophylline with continuous administration of oxygen. When he is slightly better mersalyl completes the picture.

Conclusion

Having thus brought round the patient to near normally we should embark on a long range policy of regulating his life.

His occupation whether suitable or not and his home and place of work whether it involves climbing steps or going uphill is to be considered. His hours of work and habits have to be adjusted. Excercise short of fatigue is encouraged and Anaemia corrected and focal sepsis eliminated.

In children, their education, recreational activities and types of future employment should be mapped. Middle age patients have to be impressed that no one is indispensable for that particular work and a change of regimen to suit their heart is beneficial to them.

A day in bed once a week goes a long way

But under no circumstance we should be over cautious and err in making a patient a neurotic.

Thus in management of heart failures, every aspect of the patient, his pathological state, his present condition, his response to therapy, his social and economic state, and type of rehabilitation is to be thought of and worked out satisfactorily for an ideal recovery.

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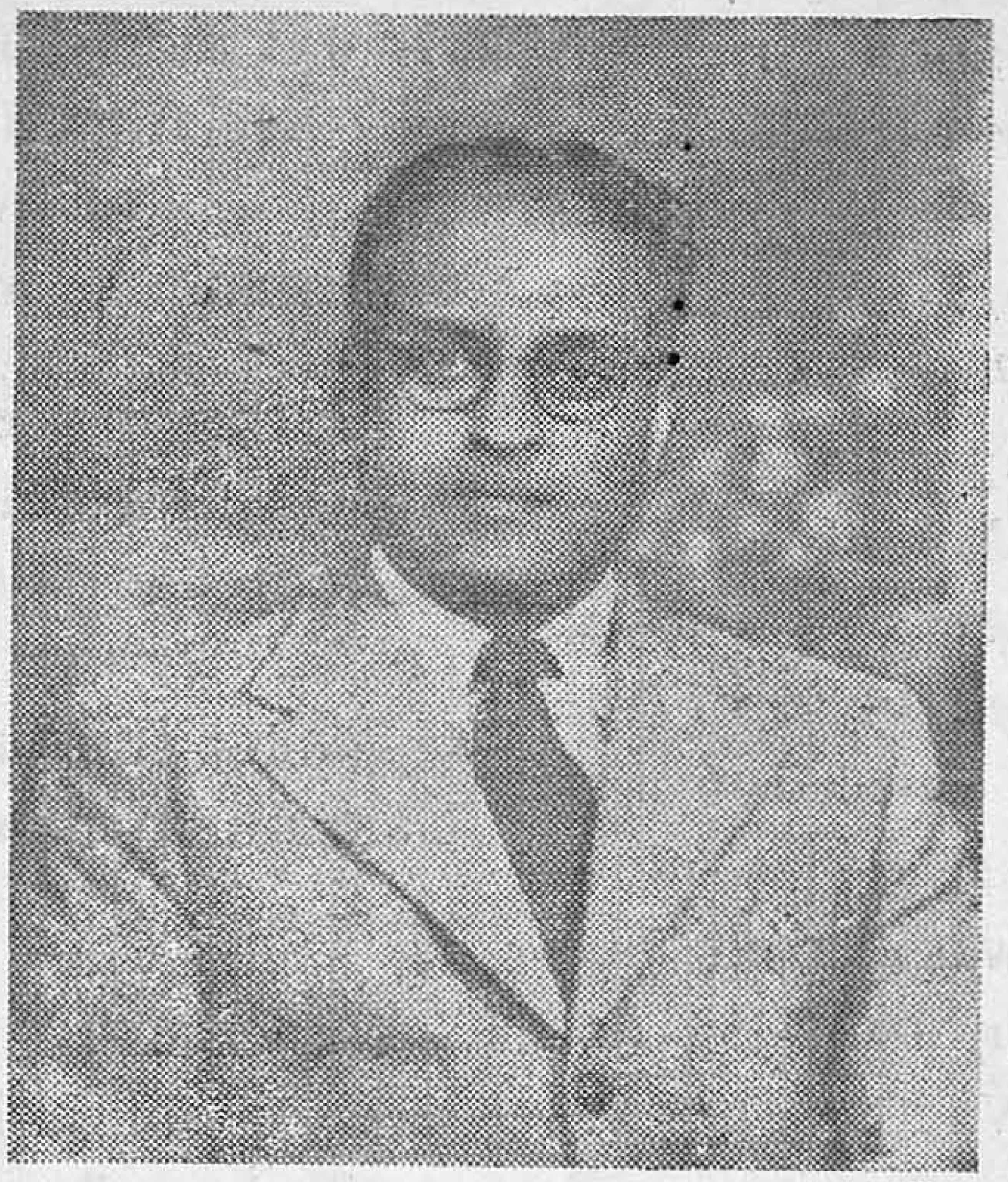
OBITUARY



Dr. I. G. K. Menon

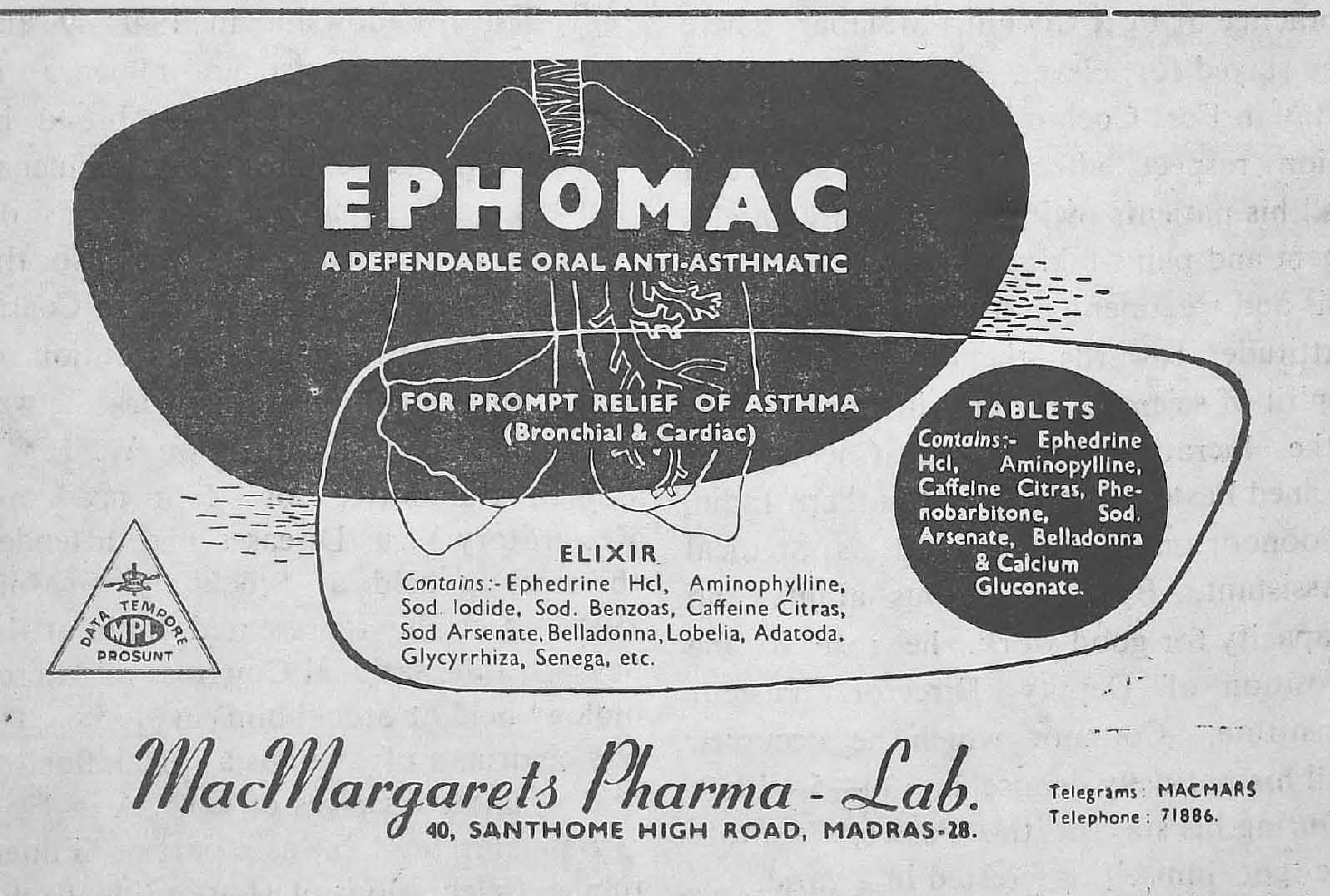
Dr. I. G. K. Menon was born on 27 March 1907 and after a successful career in Madras Medical College started general practice at Fort Cochin, Malabar where he stayed for eleven years. During his stay in Fort Cochin he won the admiration, respect, affection and confidence of all his patients owing to his really intelligent and pains-taking methods of diagnosis and treatment and to his sympathetic attitude towards them. Due to the spirit of scientific enquiry in him he left the lucrative practice at Cochin and joined Pasteur Institute of Southern India, Coonoor on 27 April 1943 as Medical Assistant. By virtue of his ability and capacity for good work, he rose to the position of Deputy Director, Pasteur Institute, Coonoor which he occupied till his untimely demise on 30—5—1959. During his stay in the Pasteur Institute he got himself interested in a variety of subjects like, Tropical Eosinophilia, Intestinal Fuso-spirochaetosis, Coagulation of blood, Action of heparin on venoms and influenza. He was awarded the Govt. of India Travel Fellowship in 1948-49 and was specially trained in influenza in London. After the training abroad he was continuously interested in influenza and has many notable contributions on influenza to his credit. He was also the Observer, Govt. of India Influenza Centre in Coonoor ever since its inception in 1950. In recognition of his work, he was nominated as a member on W. H. O. Expert Committee on Influenza and Respiratory Virus Diseases and attended the meeting held at Stockholm in July 1958. Also he represented India at the Seventh International Congress of Microbiology held at Stockholm in 1958. He was chairman of symposia on influenza held (i) under auspices of I. M. A in 1957 at Bangalore and (ii) as a part of Golden Jubilee Celebrations of Haffkine Institute Bombay in 1959.

He was indeed a very active member of Indian Medical Association. He was the person to start Cochin Medical Association in September 1937 and was Secretary of Cochin Association for first five years. Again in 1947, he was mainly responsible for reviving the Nilgiri District Branch of I. M. A. and was the first Secretary of the new Association. Ever since 1947, after the revival of this branch of I. M. A. he evinced a very keen, active, lively interest in the affairs of the Association. He was elected Vice-President of this branch in 1954–'55 and President in 1957–'58. Whether he was an office-bearer or not, he was the guiding force behind the activities of this branch of Indian Medical Association. He was indeed a very respected member of Association and it is not exaggeration to say that he lived in the hearts of the men whom he met.

In the passing away of Dr. I. G. K. Menon, the country has lost a worker of outstanding ability and the medical profession, a genial, courteous and sincere colleague and the Indian Medical Association an ardent and conscientious member.

He leaves behind his wife, two daughters, a son-in-law and a host of his medical colleagues, friends and co-workers to mourn his loss.

MAY HIS SOUL REST IN PEACE!



ASSOCIATION NEWS

ANAMALAI BRANCH

The Annual General Body meeting of the Association was held on 26—4—59 at Dr. M. K. R. Jayachandran's residence, when the following office bearers were elected for the ensuing year.

President :
Dr. (Mrs.) G. Dissawalla.

Vice President :
Dr. M. A. Razak.

Secretary :
Dr. Korula John.

Joint Secretary :
Dr. K. Janardhan.

Dr. Y. P. Vasudevan then gave a talk on the activities of the Indian Medical Association, and appealed to the members to recruit more members and to pay more towards the Central Indian Medical Association building fund. Dr. R. Mahadevan gave a talk on his short experiences and the difficulties he encountered as a Medical Officer in Tea Plantations. He also gave a short talk on Congenital Heart disease, and showed two films, one an operation on a case of Patent Ductus Arteriosus, and another a case of Tetralogy of Fallot.

The State Council meeting was held on 23rd May at the Monica Staff Club under the auspices of the Association.. After the State Council meeting, the clinical meeting of the Association was held, when Dr. P. V. Kurian of Coonoor, gave a talk on Hospital Staphylococcus.

COIMBATORE BRANCH

The Thirtyfourth Annual General Body meeting was held on Sunday the 24th May 1959 in the Association premises. Dr. T. V. Sivanandam, MBBS., MLC., President presided. The President inaugurated the Thirtyfourth Annual General Meeting. Dr. S. G. Rajarathnam, MBBS., Hony. Secretary, read the Annual Report and Statement of Accounts for the year 1958 and the same was unanimously adopted. Then the Office-Bearers were elected unanimously for the year 1959 :—

President :
Dr. D. Sundareswaran

Vice-President :
Dr. G. T. Gopalakrishna Naidu

Hony. Secretary :
Dr. M. P. Jesudasan

Associate-Secretary :
Dr. N. S. Ramamoorthy

Hony. Treasurer :
Dr. S. G. Rajarathnam.

Managing Committee :—

Dr. A. G. Leelakrishnan
Dr. S. V. Subramaniam
Dr. C. A. K. Shanmugam
Dr. S. Ganapathy
Dr. C. R. Seshadri
Dr. D. Anantharaman
Dr. R. G. Iyer
Dr. C. Arumugam
Dr. K. R. Venkatesalu
Dr. V. Sriramulu
Dr. R. Padmanabhan
Dr. Miss. S. V. Swarnambal
Dr. Miss. N. Kamalam
Dr. Mrs. R. Saradambal

Provincial Council Members :—

Dr. T. V. Sivanandam
Dr. A. G. Leelakrishnan
Dr. C. Arumugam
Dr. C. N. Santhanam

Dr. S. Ganapathy
Dr. M. G. Nair
Dr. G. T. Gopalakrishna Naidu
Dr. S. G. Rajarathnam
Dr. M. P. Jesudasan

Central Council Members :

Dr. C. Arumugam
Dr. N. K. Sampath
Dr. A. G. Leelakrishnan.

Dr. M. V. Krishnamoorthy, BA., MRCP., DTM & H. District Medical Officer, Government Headquarters Hospital, Coimbatore presided over the Scientific session. Dr. A. L. Annamalai, MRCP., DTM & H., Physician, Government General Hospital, Madras delivered an instructive lecture on "COUGH - Its Clinical Significance and Treatment" along with the playing of tape-records of different types of Cough and also projection of slides and X-Ray films.

* * *

CHINGLEPUT BRANCH

The ordinary Meeting of the Association was held on Saturday the 20th June 1959 in Venugopal Club, Chingleput.

Dr. V. S. Subramanian M.B., B.S., M.SC., (Medl) F. A. C. S. Hony. E. N. T. Surgeon, General Hospital delivered a lecture on "Modern Trends in E. N. T. Surgery".

* * *

CHETTINAD BRANCH

The monthly meeting of the Association was held on Saturday, 13th June '59 at the S. M. S. High School, Karaikudi.

Dr. P. H. Sundaram, B.SC., M.B., B.S., Asst. Surgeon, B. C. G. campaign, gave a talk on 'B. C. G. Vaccination'. A film on 'B. C. G. Vaccination', was also shown.

* * *

NAGAPATTINAM BRANCH

An ordinary meeting of the Association was held on 2—6—59 at Dr. T. S. Varadachariar's clinic. Dr. A. Thiyagarajan president spoke about the Late Diagnosis & treatment of Intestinal Amoebiasis.

* * *

NILGIRI BRANCH

The monthly meeting of the Association was held on Saturday 27th June 1959 at Pasteur Institute, Coonoor.

Nomination for President & two Vice-Presidents of Madras State Branch of I. M. A., was held. Case Demonstration by Major Rustogi, A. M. C., Military Hospital, Wellington, was held.

* * *

TANJORE BRANCH

A meeting of the Association was held on Sunday, the 31st May '59 at the Medical School Buildings, R. M. Hospital Tanjore.

Dr. E. Balakrishnan, M.B., M.S., D. O., Govt. Ophthalmic Hospital, Egmore addressed the gathering on, "Uncle's Daughter-What Price ?"

TIRUCHY BRANCH

A monthly meeting of the Association was held on Saturday the 18th April 1959 in the Association premises, Tiruchy. Dr. R. Sambasivan presided.

Dr. K. Venkata Rao, M. D., Hony. Physician, Govt. Stanley Hospital, and In-charge of Chest Clinic, Stanley Hospital, Madras addressed the members on "Coronary Insufficiency".

* * *

A monthly meeting of the Association was held on Saturday the 16th May 1959 in the Association premises, Tiruchy. Dr. R. Sambasivan presided.

Dr. S. Kalyanaraman, M. S., Asst. Professor of Surgery, Stanley Medical College, Madras addressed the members on "Surgical Shock".

* * *

An Urgent meeting of the Association was held on Friday the 22nd May 1959 in the Association premises to consider the subject of "Rural Medical Relief voluntary service by the members of the Association".

* * *

A monthly meeting of the Association was held on Saturday the 20th June 1959 in the Association premises, Tiruchy. Dr. R. Sambasivam presided. Dr. P. K. Kalyanaraman, M.B.,B.S., Hony. Physician, Govt. Head Quarters Hospital, Coimbatore, addressed the members on "Effective Cardiac Drugs". Nominations for one President and 2 Vice-Presidents for the Madras State Branch of I. M. A. were held.

SOUTH ARCOT BRANCH

The monthly meeting of the Association was held on 25th April '59 in the Ramaswamy Chettiar's Town High School premises, Chidambaram. Dr. R. Subramaniam, M. R. C. P., Professor of Medicine. Madras Medical College and Physician Govt. General Hospital, Madras spoke on "Diagnosis and Treatment of Cirrhosis Liver".

TIRUNELVELI BRANCH

The monthly meeting of the Association was held on Saturday, the 31st January 1959 at Palayamkottai, under the presidentship of Dr. P. Vadivale, the Vice-President. Dr. A. Rajagopalan, M. B., B. S., gave an interesting talk on "Intestinal obstruction".

Condolence resolution on the death of Dr. S. Kumara Pillai was passed, all members standing.

* * *

The monthly meeting of the Association was held on Saturday, the 28th February, 1959 at Nanguneri in the premises of the Town Club, under the presidentship of Dr. D. I. Abraham.

Dr. T. Titus, Dt. Med. Officer, Tirunelveli delivered an exhaustive lecture on 'Hernia'.

* * *

The monthly meeting of the Association was held at Palayamkottai on Saturday, the 25th April, 1959.

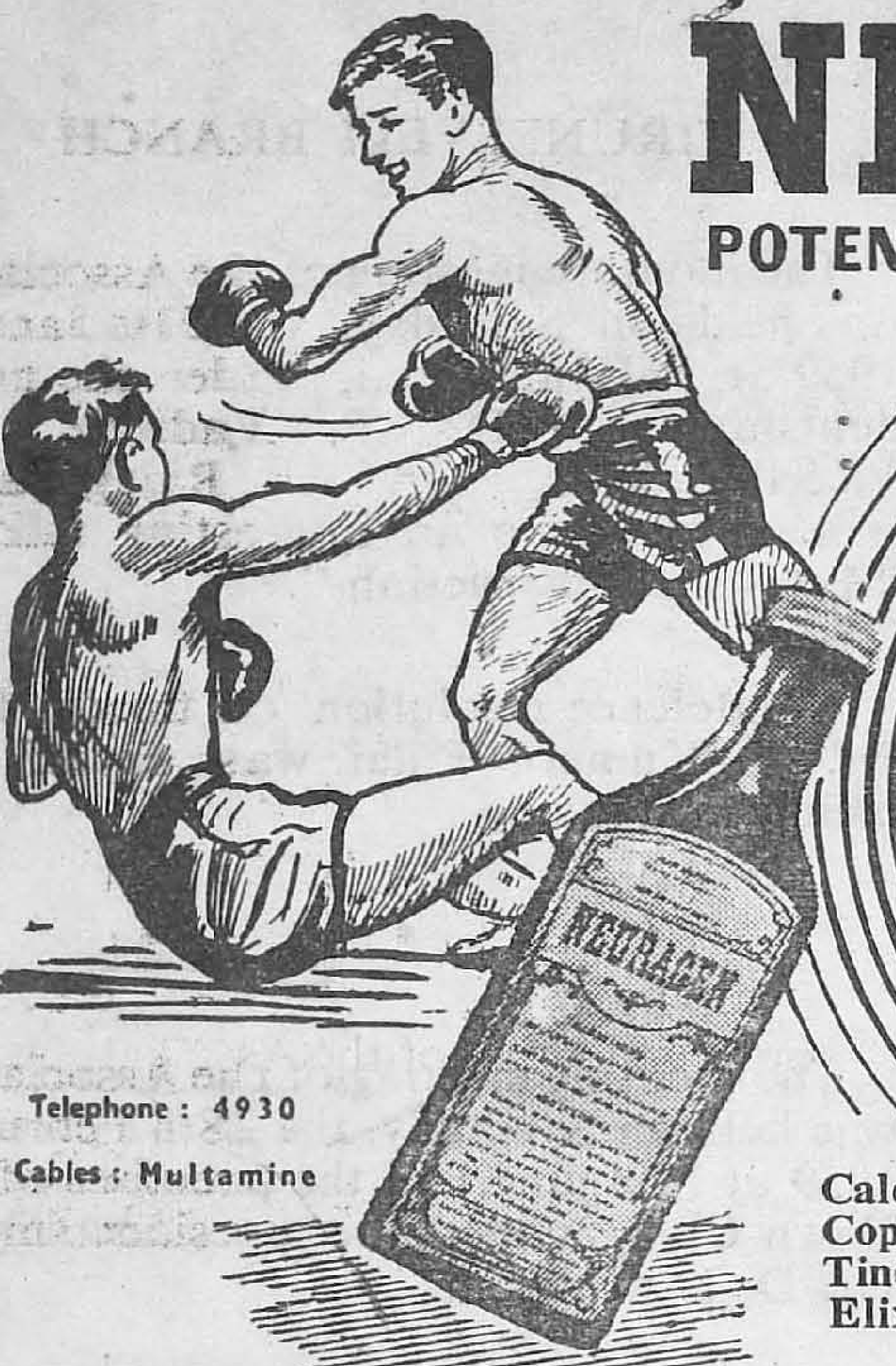
Nomination of one President and three Vice-Presidents to the I. M. A. for 1959—60 was held.

Dr. (Srimathi) Kamakshi Kabir, M. B., B. S., D., G. O., delivered a lecture on "Rupture Uterus".

* * *

NEURAGEN

POTENT NERVINE TONIC & REVITALISER



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RADIANT HEALTH

RECUPERATIVE
& PICK-ME-UP

Telephone : 4930
Cables : Multamine

Glycerophosphate of Sodium, Potassium, Calcium, Iron, Manganese and Strychnine, Copper Sulphate, Caffeine, Papain, Diastase, Tinctura Aurantii, Kola Champ Flavour, Elixir Base.

INDO-FRENCH PHARMACEUTICAL CO., CATHOLIC CENTRE, MADRAS-I.

For the treatment of all types of ANAEMIAS

FERMINA

Liquid :
Each 30 ml. contains :

Liver extract from 15 gms. of fresh liver having B_{12} activity equivalent to 1·0 mcg. of Cyanocobalmin. Stomach extract derived from 10 gm. of stomach.

Iron (Colloidal)	..	0·2 Gm.
Cobalt (Gluconate)	..	25 mg.
Folic acid I. P.	..	15 mg.
Vitamin B_{12} I. P.	..	100 mcg.
Non-Syrupy Base Q. S.		

Injectable :
Each ml. contains :

Liver extrat derived from 5 gm. of fresh liver :

Iron (Colloidal)	.	12·5 mg.
Cobalt Gluconate	..	2·5 mg.
Folic acid I. P.	..	5·0 mg.
Vitamin B_{12} B. P.	..	30·0 mcg.
Sodium Cacodylate N. F.	..	0·1 Gm.
Phenol B. P. (Preservative)		0·5%
Procaine Hydrochloride B. P.		2%

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Detailed literature on request from :

THERAPEUTIC PHARMACEUTICALS

Administrative offices :
43, QUEEN'S ROAD, BOMBAY-2.

Biological & Pharmaceutical Laboratories :
54, PROCTOR ROAD, BOMBAY-7.
38, CARTER ROAD, BOMBAY-41.